

## Claims

1. In a wireless communications system having a wireless channel with time slots for transmission of delay-sensitive data and non-delay-sensitive data, a method for determining whether a time slot in the wireless channel should be allocated for delay-sensitive data or non-delay-sensitive data, the method comprising the steps of:
- 5       determining an ideal slot separation for each delay-sensitive application using the wireless channel;
- determining, for each delay-sensitive application, whether a number of slots since a time slot was granted to the each delay-sensitive application is equal to or greater than the ideal slot separation for the each delay-sensitive application; and
- 10       assigning a time slot to carry delay-sensitive data for the each delay-sensitive application that has the number of slots since a time slot was granted to the each delay-sensitive application that is equal to or greater than
- 15       the ideal slot separation for the each delay-sensitive application.
2. The method of claim 1 further comprises the step of:
- assigning a time slot to carry non-delay-sensitive data if each delay-sensitive application has the number slots since a time slot was granted to the each delay-sensitive application that is less than the ideal slot
- 5       separation for the each delay-sensitive application.
3. The method of claim 1 further comprising the step of:
- determining whether an acknowledgement time slot needs to be allocated to acknowledge a packet sent over the wireless channel; and
- assigning a time slot for acknowledging the packet if the
- 5       acknowledgement time slot needs to be allocated.
4. The method of claim 3 further comprising the step of:
- determining whether a non-delay-sensitive slot needs to be allocated; and

determining whether a maximum time between random access  
5 time slots has been met or exceeded;  
assigning a time slot for a random access to the wireless  
channel if a non-delay-sensitive slot is not needed; and  
assigning a time slot for non-delay-sensitive data if a time slot is  
needed for non-delay-sensitive data and if the maximum time between  
10 random access slots has not been met or exceeded.

5. The method of claim 4 wherein the step of determining whether a  
non-delay-sensitive slot needs to be allocated further comprises determining  
whether the non-delay-sensitive slot is needed to accommodate transfers for  
pending applications using the wireless channel.

5 6. The method of claim 3 wherein the step of determining whether an  
acknowledgement slot is needed comprises the steps of:

detecting whether a packet transferred over the wireless  
channel requires an acknowledgement;  
5 determining whether an acknowledgement time out value has  
occurred since detecting that an acknowledgement slot is required;  
determining that an acknowledgement slot is needed if an  
acknowledgement time out value has occurred.

7. The method of claim 6 wherein the step of determining whether an  
acknowledgement time out value has occurred further includes the steps of:  
initializing a counter for each packet that needs an acknowledgement  
slot;

5 incrementing the counter for each slot that occurs on the wireless  
channel;

comparing the counter with the acknowledgement timeout value to  
determine whether the counter is equal to or greater than the  
acknowledgement timeout value.

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8. The method of claim 1 wherein determining the ideal slot separation for each delay-sensitive application further includes dividing a total number of slots that occur in one second over the wireless channel by a number of slots per second allocated to the each delay-sensitive application.

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9. The method of claim 1 wherein the step of determining, for each delay-sensitive application, whether a number of slots since a time slot was granted to the each delay-sensitive application is equal to or greater than the ideal slot separation for the each delay-sensitive application further comprises

5 the steps of:

initializing a counter for each delay-sensitive application;

incrementing the counter by one for each slot occurring on the wireless channel; and

comparing the counter for each delay-sensitive application with the

10 ideal slot separation for the each delay-sensitive application.

10. The method of claim 9 further comprising the steps of:

updating the counter for a delay-sensitive application that is granted a delay-sensitive slot with a number of slots that occurred beyond the ideal slot separation for the delay-sensitive application.

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11. In a wireless communications system where packets of data are transmitted over a wireless channel, a method for determining which packet of a plurality of packets should be transmitted next over the wireless channel, the method comprising the steps of:

5 determining a precedence value for each packet to be transmitted over the wireless channel;

selecting a packet to be transmitted next over the wireless channel based on the precedence value, wherein the precedence value for each packet is determined based on whether the each packet includes data to set up communications over the wireless channel.

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12. The method of claim 11 wherein the precedence value for each packet is determined based on whether the each packet includes audio or video data.

13. The method of claim 12 wherein the precedence value for each packet is determined based on whether the each packet includes emergency data.

14. The method of claim 13 wherein the precedence value for each packet is determined based on whether the each packet includes non-delay critical data.

15. The method of claim 11 wherein the precedence value for a packet that includes data to set up communications over the wireless channel is of a higher priority than precedence values for other packets.

16. In a wireless communications system where packets of data are transmitted over a wireless channel, a method for determining a protocol for transmitting packets over the wireless channel, the method comprising the steps of:

5                   determining a service type for each packet to be transmitted over the wireless channel;

                  selecting a protocol for transmitting each packet over the wireless channel based on the service type, wherein the protocol includes a type of error correction.

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17. The method of claim 16 wherein the protocol includes a method for accessing the wireless channel.

18. The method of claim 17 wherein the method of accessing the wireless channel includes accessing the channel using a time slot allocated to delay-sensitive data.

19. In a wireless communications system having a wireless channel with time slots for transmission of delay-sensitive data and non-delay-sensitive data, an apparatus for determining whether a time slot in the wireless channel should be allocated for delay-sensitive data or non-delay-sensitive data, the apparatus comprising:

a processor that:

determines an ideal slot separation for each delay-sensitive application using the wireless channel;

determines, for each delay-sensitive application, whether a number of slots since a time slot was granted to the each delay-sensitive application is equal to or greater than the ideal slot separation for the each delay-sensitive application; and

assigns a time slot to carry delay-sensitive data for the each delay-sensitive application that has the number of slots since a time slot was granted to the each delay-sensitive application that is equal to or greater than the ideal slot separation for the each delay-sensitive application.

20. The apparatus of claim 19 wherein the processor:

assigns a time slot to carry non-delay-sensitive data if each delay-sensitive application has the number slots since a time slot was granted to the each delay-sensitive application that is less than the ideal slot separation for the each delay-sensitive application.

21. The apparatus of claim 19 wherein the processor:

determines whether an acknowledgement time slot needs to be allocated to acknowledge a packet sent over the wireless channel; and assigns a time slot for acknowledging the packet if the acknowledgement time slot needs to be allocated.

22. The apparatus of claim 21 wherein the processor:

determines whether a non-delay-sensitive slot needs to be allocated;  
and  
determines whether a maximum time between random access time  
5 slots has been met or exceeded;  
assigns a time slot for a random access to the wireless channel if a  
non-delay-sensitive slot is not needed; and  
assigns a time slot for non-delay-sensitive data if a time slot is needed  
for non-delay-sensitive data and if the maximum time between random access  
10 slots has not been met or exceeded.

23. The apparatus of claim 22 wherein the processor:  
determines whether the non-delay-sensitive slot is needed to  
accommodate transfers for pending applications using the wireless channel.

24. The apparatus of claim 21 wherein the processor determines  
whether an acknowledgement slot is needed by:  
detecting whether a packet transferred over the wireless channel  
requires an acknowledgement;  
5 determining whether an acknowledgement time out value has occurred  
since detecting that an acknowledgement slot is required; and  
determining that an acknowledgement slot is needed if an  
acknowledgement time out value has occurred.

25. The apparatus of claim 24 wherein determining whether an  
acknowledgement time out value has occurred further includes the processor:  
initializing a counter for each packet that needs an acknowledgement  
slot;  
5 incrementing the counter for each slot that occurs on the wireless  
channel;  
comparing the counter with the acknowledgement timeout value to  
determine whether the counter is equal to or greater than the  
acknowledgement timeout value.

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26. The apparatus of claim 19 wherein the processor determines the ideal slot separation for each delay-sensitive application by dividing a total number of slots that occur in one second over the wireless channel by a number of slots per second allocated to the each delay-sensitive application.

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27. The apparatus of claim 19 wherein the processor determines, for each delay-sensitive application, whether a number of slots since a time slot was granted to the each delay-sensitive application is equal to or greater than the ideal slot separation for the each delay-sensitive applications by:

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initializing a counter for each delay-sensitive application;  
incrementing the counter by one for each slot occurring on the wireless channel; and

comparing the counter for each delay-sensitive application with the ideal slot separation for the each delay-sensitive application.

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28. The apparatus of claim 27 wherein the processor:  
updates the counter for a delay-sensitive application that is granted a delay-sensitive slot with a number of slots that occurred beyond the ideal slot separation for the delay-sensitive application.

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29. In a wireless communications system where packets of data are transmitted over a wireless channel, an apparatus for determining which packet of a plurality of packets should be transmitted next over the wireless channel, the apparatus comprising:

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a processor that:

determines a precedence value for each packet to be transmitted over the wireless channel; and

a wireless modem coupled to the processor that:

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selects a packet to be transmitted next over the wireless channel based on the precedence value, wherein the precedence

value for each packet is determined based on whether the each packet includes data to set up communications over the wireless channel.

30. The apparatus of claim 29 wherein the precedence value for each packet is determined based on whether the each packet includes audio or video data.

31. The apparatus of claim 30 wherein the precedence value for each packet is determined based on whether the each packet includes emergency data.

32. The apparatus of claim 31 wherein the precedence value for each packet is determined based on whether the each packet includes non-delay critical data.

33. The method of claim 29 wherein the precedence value for a packet that includes data to set up communications over the wireless channel is of a higher priority than precedence values for other packets.

34. In a wireless communications system where packets of data are transmitted over a wireless channel, an apparatus for determining a protocol for transmitting packets over the wireless channel, the apparatus comprising:  
a processor that:

5               determines a service type for each packet to be transmitted over the wireless channel; and

a wireless modem coupled to the processor that:

              selects a protocol for transmitting each packet over the wireless  
channel based on the service type, wherein the protocol includes a  
10           type of error correction.

35. The method of claim 34 wherein the protocol includes a method for accessing the wireless channel.

36. The method of claim 35 wherein the method of accessing the wireless channel includes accessing the channel using a time slot allocated to delay-sensitive data.

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